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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/080,954	02/22/2002	Balaji Raghothaman	NC17581 (NOKI02-17581)	1604
30973	7590	07/06/2004	EXAMINER JACKSON, BLANE J	
SCHEEF & STONE, L.L.P. 5956 SHERRY LANE SUITE 1400 DALLAS, TX 75225			ART UNIT 2685	PAPER NUMBER 4

DATE MAILED: 07/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/080,954

Applicant(s)

RAGHOTHAMAN ET AL.

Examiner

Blane J Jackson

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 12 is objected to because of the following informalities: The claim section headed "Balji's Comment" is improper claim form, appears to be included by mistake and expected to be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 12-20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the subject matter of claim 1, does not reasonably provide enablement for a radio communication system with an "angle determiner" as introduced in claim 12. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Chin et al. (U.S. Patent 6,694,155).

As to claims 1-4 and 11, Chin teaches a method and radio communication system having a first communication station and a second communication station between which data is communicated, data communication by the second communication station to the first communication station effectuated upon a first channel and data communication by the first communication station to the second communication station effectuated upon a second channel, the first communication station having an antenna array capable of forming an adaptively-selectable antenna pattern configuration, an improvement of apparatus for selecting the antenna pattern configuration formed by the antenna array responsive to indications of data communicated by the second communication station to the first communication station (a cellular base station is the first station, a mobile station is the second station utilizing,

for example CDMA/FDD protocol, where frequency division duplex (FDD) uses different channel frequencies for the uplink and downlink, column 4, lines 62-67, column 5, lines 45-53), the apparatus comprising:

A reformulator coupled to receive the indications of the data communicated by the second communication station to the first communication station (mobile to base station-uplink), the reformulator for reformulating the indication into a vector representation of the indications, the vector representation including a coefficient vector (uplink signals used to estimate the Uplink Channel Covariance Matrix (UCCM), figure 2, column 5, line 62 to column 6, line 19),

A coefficient-vector calculator operable responsive to formation of the vector representation by the reformulator, the coefficient-vector calculator for calculating values of the coefficient vector forming a portion of the vector representation formed by the reformulator (the Downlink Channel Covariance Matrix (DCCM), figure 3, column 6, line 24 to column 8, line 36),

A second channel, channel characteristic calculator coupled to receive indications of the values of the coefficient vector formed by the coefficient-vector calculator, the second channel, channel characteristic calculator for calculating indications of characteristics of the second channel, the indications of the characteristics of the second channel used to select the antenna pattern configuration (downlink beamforming weights can be generated from DCCMs using several approaches, column 5, line 18-25 and system summary: column 3, line 42 to column 4, line 25).

As to claim 5, Chin teaches the reformulator reformulates the first channel, channel correlation matrix into a single-column matrix, the single-column matrix forming the coefficient vector (figure 3, the UCCM is first converted into a columnized UCCM vector, column 6, lines 24-32 and general: column 3, lines 64 to column 4, line 8).

As to claim 6, Chin teaches the coefficient vector calculator calculates optimal values, according to a selected optimization scheme of the coefficient vector (the peak restraint method compatible with FDD systems, column 4, lines 1-10).

As to claim 7, Chin teaches the apparatus of claim 6 wherein the optimization scheme comprises a minimization scheme (three algorithms for computing columnized DCCM vector can be used with awareness of complexity of each: column 7, line 48 to column 8, line 31).

As to claim 8, Chin teaches the indications of the characteristics of the second channel formed by the second channel, channel characteristic calculator comprise a second channel correlation matrix (figure 2, the downlink channel covariance matrix estimator (DCCM)).

As to claim 9, Chin teaches an antenna pattern configuration selector coupled to the second channel, channel characteristic calculator, the antenna configuration selector for selecting responsive to the indications of the characteristics of the second

channel calculated by the second channel characteristic calculator, the antenna pattern (figure 4, compute principal eigenvector of DCCM for downlink beamforming weights).

As to claim 10, Chin teaches wherein the antenna array comprises a plurality of antenna devices, each antenna device having a selectable weighting associated therewith and wherein the antenna pattern configuration selector selects weightings associated with the antenna devices (figure 2, plurality of antenna devices, figure 5, the downlink beam forming generator using DCCMs and downlink data rate information to generate beam forming weights, column 8, lines 46-53).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ylitalo et al. (U.S. Patent 6,671,499) discloses a method for directing an antenna beam by measuring the strengths of signals received from different paths of arrival and selecting the strongest beam direction. Bonck et al. (U.S. Patent 6,606,058) discloses a beamforming method for adaptive antenna arrays where antenna weights are determined for the antenna elements for downlink transmissions based on directional information of the uplink. Boros et al. (U.S. Patent 6,615,024) discloses a means for estimating the downlink signature based on uplink and downlink calibration signals to provide processing weights for smart antenna processing. Hottinen et al. (U.S. Patent 6,584,302) discloses downlink beamforming in a TDD communication system. Dogan (U.S. Patent 6,650,881) discloses means to determine initial

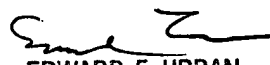
beamforming weights before timing or delay and frequency offset are known for spatial diversity antennas. Johansson (U.S. Patent 6,487,423) discloses means to establish a cellular FDD or TDD type connection between two fixed nodes uses weighted adaptive antennas with consideration for a reflecting body. Hudson et al. (U.S. Patent 6,477,161) discloses a method for downlink beamforming for FDD cellular systems.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J Jackson whose telephone number is (703) 305-5291. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJJ


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